

## **REMARKS**

### **I. Application Status**

Claims 17-41 are pending in the Subject Application. Claims 17, 24, 32, and 33 are independent claims.

In the Office Action mailed August 7, 2007 ("Office Action"), claims 17-41 were rejected. Claims 32, 33, 38, and 40 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,944,985 to Alexander et al. ("Alexander"). Claims 39 and 41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Alexander. Claims 17-31 and 34-37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Alexander in view of either U.S. Patent No. 4,292,029 to Craig et al. ("Craig") or U.S. Patent No. 5,718,047 to Nakayama et al. ("Nakayama").

An appeal was taken in response to the Office Action. The Board of Patent Appeals and Interferences (BPAI) mailed a Decision on the appeal on August 27, 2010, affirming-in-part, reversing-in-part, and entering a new ground of rejection. The BPAI affirmed the rejection of claims 17-31 and 34-37 as set forth in the Office Action. The BPAI reversed the rejection of claims 32, 33, 38, 39, 40, and 41 as set forth in the Office Action. The BPAI entered a new ground of rejection against claims 32, 33, 38, 39, 40, and 41 under 35 U.S.C. § 103(a) as being unpatentable over Alexander. Accordingly, pending claims 17-41 currently stand rejected.

Applicant respectfully submits that the amendments to the claims presented herein overcome the rejections affirmed and entered on appeal. In view of the amendments and remarks presented herein, Applicant respectfully requests reconsideration, withdrawal of the rejections, and allowance of the Subject Application. All references to the "Specification" herein refer to the paragraph numbering of the substitute specification filed on April 28, 2004 in the Subject Application.

## II. Claim Amendments

Independent claims 17, 24, and 32 are amended herein to recite "a matrix comprising a polymer material" and wherein the fillers are "coated with a layer of material that is compatible with the matrix, the coating comprising a material selected from the group consisting of a polymer and a monomer." Support for the amendments is found in paragraphs [0005], [0033]-[0037], and [0063]-[0065] of the Specification.

Independent claim 33 is amended herein to recite "a matrix comprising a ceramic material" and "nanofillers with domain size less than 100 nanometers, the nanofillers selected from the group consisting of metallic nanofillers and ceramic nanofillers." Support for the amendments is found in paragraphs [0033] and [0066]-[0072] of the Specification.

It is believed that the present amendments do not add new matter to the Subject Application and are fully compliant with 35 U.S.C. §§ 112 and 135. The present amendments are made without prejudice or disclaimer. The present amendments are made solely to expedite the prosecution of the Subject Application.

## III. Claim Rejections under 35 U.S.C. § 103(a)

Applicant respectfully submits that independent claims 17, 24, 32 and 33 are not *prima facie* obvious in view of Alexander, alone or in combination with Craig and/or Nakayama. The only disclosure in Alexander regarding printable formulations such as inks and pastes is presented in column 13, lines 41-47, and from column 15, line 62 to column 16, line 15. These portions of Alexander are reproduced below.

There are powders which are a product of the processes of this invention which have a core of metal with at least a first layer of another metal plated thereon. For example, in conductive paints, pastes or inks, it is preferable to have a core of one metal e.g., copper or silver, 45 coated with another corrosion resistant metal e.g., gold to achieve good properties.

### As Metallic Inks

Metallic inks involving noble metals are, today, commonly used. These inks require discrete, constant sized 65 and substantially spherical particles in order to achieve good performance. Silver composites containing silica can be prepared in which there is little or no aggrega-

tion in the structure. These materials are useful as metallic inks. Silica particles can be obtained in a variety of sizes. "Ludox" from E. I. duPont de Nemours and Company can be purchased in sizes of 7, 12 or 22 nano-  
5 meters. Colloidal silica can be grown to larger sizes in aqueous solutions by heating under pressure as has already been mentioned (see Iler's book).

A few monolayers of tin oxide or tin silicate depos-  
10 ited on the silica particles will help maintain the particles as separate and discrete during silver plating. There may be some aggregation of the particles during the plating process but in many cases on centrifuging and adding distilled water the silver-silica will peptize into  
15 an aquasol. Such aquasols often appear black because of the small particle size.

Thus, Alexander discloses paints, pastes, and inks that incorporate filler particles having a metal or ceramic core with a layer of another metal plated onto the surface of the core, for example, copper/silver particles coated with gold and silica particles coated with silver. Alexander does not teach or suggest metallic or ceramic nanofillers that are coated with a layer of material that is compatible with a polymer matrix, the coating comprising a material selected from the group consisting of a polymer and a monomer, as recited in independent claims 17, 24, and 32.

Further, Applicant respectfully submits that Craig and Nakayama do not cure the deficiencies of Alexander. Craig merely discloses that fillers can have shapes in the forms of spheres, platelets, fibers, whiskers, and the like. *Craig*, c.6, ll.36-38. Nakayama merely discloses a conductive paste used for forming circuit patterns, wherein filler particles can have shapes such as fibers, whiskers, or flakes. *Nakayama*, c.5, ll.51-67. There is no disclosure presented in either Craig or Nakayama that teaches or suggests nanofiller particles coated with a layer of material that is compatible with a polymer matrix, the coating comprising a material selected from the group consisting of

a polymer and a monomer

Still further, Applicant respectfully submits that a person skilled in the art would not have been motivated or have reason to modify the particles disclosed in Alexander to be coated with a layer of material selected from the group consisting of a polymer and a monomer. In fact, the purpose of the invention disclosed in Alexander is to provide metal-coated particles. *Alexander*, c.3, ll.64-68. Modifying Alexander to incorporate a polymeric or monomeric coating would render the invention disclosed in Alexander unsatisfactory for its intended purpose because it would no longer provide metal-coated particles. However, as stated in MPEP § 2143.01, if a "proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." Consequently, Alexander cannot render the present claims *prima facie* obvious.

In addition, Alexander does not teach or suggest any printable formulation comprising a matrix, wherein the matrix comprises a ceramic material, as recited in independent claim 33. For example, nanofillers and various ceramic matrices can be incorporated into screen printable slurries, as described in the Subject Application. Alexander fails to teach or suggest such compositions, but rather merely discloses paints, pastes, and inks. Further, Applicant respectfully submits that Craig and Nakayama do not cure the deficiencies of Alexander.

Accordingly, Applicant respectfully submits that the claims of the Subject Application, as amended herein, are patentable over Alexander, Craig, and Nakayama. MPEP § 2143.03.

**VI. Conclusion**

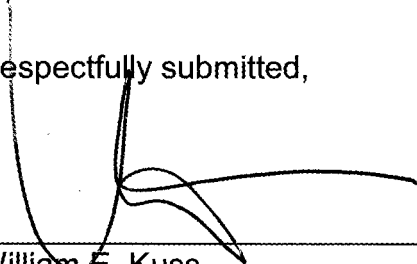
For at least the reasons discussed above, the claims of the Subject Application are believed to be in condition for allowance. Applicant respectfully requests favorable reconsideration and allowance of the Subject Application.

The present Response should not be taken as acquiescence to any of the specific rejections, assertions, statements, and the like, presented in the Office Action that are has not explicitly addressed herein. Applicant reserves the right to specifically address all such rejections, assertions, and statements in continuing applications, subsequent responses, and/or appeal or pre-appeal proceedings.

If the undersigned can be of assistance to the Examiner in addressing any additional issues to advance the application to a condition of allowance, please contact the undersigned at the number set forth below.

Oct 27, 2010  
Date

Respectfully submitted,

  
\_\_\_\_\_  
William E. Kuss  
Registration No. 41919

K&L GATES LLP  
K&L Gates Center  
210 Sixth Avenue  
Pittsburgh, Pennsylvania 15222-2613

Tel: (412) 355-6323